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SOUNDING ROCKET AND BALLOON SYSTEMS SUPPORT.(U)
JUL 79 R A BUMGARNER, A A GILCREASE F19628-76-C-0171
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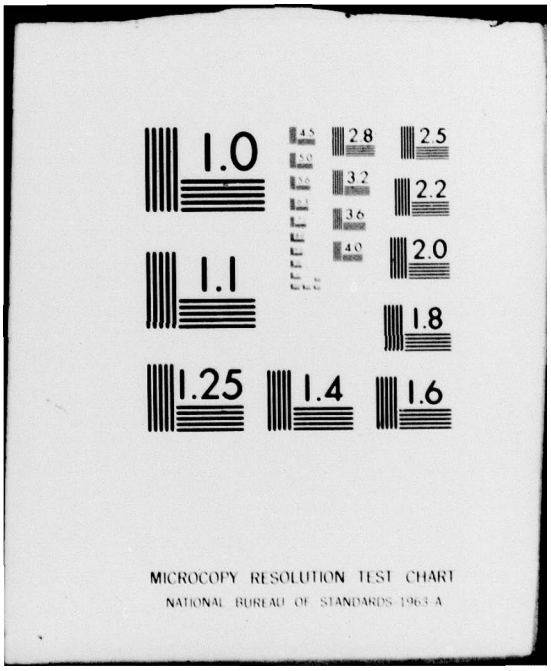
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AFGL-TR-79-0166

SOUNDING ROCKET AND BALLOON SYSTEMS SUPPORT

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LEVEL II

Final Report
15 June 1976 - 15 June 1979

18 July 1979

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AIR FORCE GEOPHYSICS LABORATORY
AIR FORCE SYSTEMS COMMAND
UNITED STATES AIR FORCE
HANSCOM AFB, MASSACHUSETTS 01731

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE	READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER: AFGL-TR-79-0166	2. GOVT ACCESSION NO.
3. RECIPIENT'S CATALOG NUMBER	
4. TITLE (and Subtitle): Sounding Rocket and Balloon Systems Support	5. TYPE OF REPORT & PERIOD COVERED: Final Rept. 15 June 1976 – 15 June 1979
6. PERFORMING ORG. REPORT NUMBER: PS00945	
7. AUTHOR(s): Raymond A. Bumgarner; Arthur A. Gilcrease	8. CONTRACT OR GRANT NUMBER(s): F19628-76-C-0171
9. PERFORMING ORGANIZATION NAME AND ADDRESS: Physical Science Laboratory, New Mexico State University, Box 3-PSL, Las Cruces, New Mexico 88003	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: 62101F; 668806AK
11. CONTROLLING OFFICE NAME AND ADDRESS: Air Force Geophysical Laboratory, Hanscom AFB, Massachusetts 01731, Contract Monitor: Raymond E. Wilton/LCS	12. REPORT DATE: 18 July 1979
	13. NUMBER OF PAGES: 6
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)	15. SECURITY CLASS. (of this report): Unclassified
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

A-Approved for public release; distribution unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Sounding Rocket Telemetry
Air Sampling Balloons

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The work performed under this contract consisted of the following; integrate, calibrate, and test, GFE range safety radar tracking beacon and parachute recovery systems; design and develop special devices as required, operate and maintain GFE telemetry station to support telemetry operations at WSMR, New Mexico; and calibrate equipment and perform analyses for air sampling balloon flights conducted at Holloman AFB, New Mexico.

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1.0 SCOPE OF WORK

The Physical Science Laboratory, New Mexico State University (PSL/NMSU) shall conduct operations to provide engineering and instrumentation support for thirty (30) rocket launch operations at WSMR, and for thirty (30) balloon launch operations at Holloman AFB, in accordance with the following:

1.1 Operate and maintain a GFE telemetry station to support launch operations at WSMR, or other launch sites that may be designated by the Contracting Officer. This telemetry station is to be used to assist with payload preparations and to support the launch operations from the blockhouse. Real time strip chart recordings and other telemetry information will be provided from any standard FM/FM or PCM payload telemetry system.

1.2 Operate any one of several government owned telemetry tracking stations at WSMR, when available, to provide a magnetic tape record from the various AFGL rockets to be launched.

1.3 Integrate GFE range safety, tracking beacon, and parachute recovery systems into the rocket payloads as required. Provide for the design, fabrication, testing and installation of sub-systems necessary to insure operation of these payload systems.

1.4 Calibrate GFE air samplers for balloon flights.

1.5 Analyze pre-flight and post-flight data and meteorological parameters to determine air flow rates, balloon trajectories and ambient atmospheric conditions.

1.6 Coordinate launch support, instrumentation support requirements for each operation. Provide a technical interface between the AFGL payload engineer and the launch site operation facilities, to insure that all required range documentation has been completed. Act as a technical representative of AFGL prior to the arrival at launch site by the responsible instrumentation engineers.

1.7 Reports are required hereunder and shall be prepared in accordance with the "Outline of Reporting Procedures for Air Force Cambridge Research Laboratories Contractors."

2.0 TECHNICAL PROGRESS

2.1 Rocket Launches Supported During the Contract Period

Launch Date	Launch No.	Vehicle Type	TM System	Launch Station
08-03-76	A35.191-4	AEROBEE 350	FM/FM	WSMR
04-21-77	A04.410-2	AEROBEE 170	FM/FM	WSMR
08-09-77	A03.509-1	AEROBEE 150	PAM/FM/FM FM/FM PCM/FM	WSMR
09-24-77	A10.705-1	PAIUTE-TOMAHAWK	FM/FM	WSMR
11-10-77	A24.609-1	ARIES	PAM/FM/FM FM/FM PCM/FM	WSMR
12-12-77	A04.602	AEROBEE 170	FM/FM PCM/FM	WSMR
01-21-78	A31.603	ASTROBEE "F"	PCM/FM	WSMR
05-15-78	A04.606-1	AEROBEE 170	PAM/FM/FM	WSMR
07-24-78	A03.604	AEROBEE 150	FM/FM	WSMR
09-15-78	A08.708-1	NIKE-TOMAHAWK	FM/FM	WSMR
09-19-78	A04.711-1	AEROBEE 170	FM/FM	WSMR
01-27-79	A24.7S2-1	ARIES	PCM/FM	WSMR

2.2 Balloon Flights Supported During the Contract Period

Date	Flight No.	Project	Location	Bln Size ($\times 10^6 ft^3$)	Alt (Kft)
08-21-76	H76-46/H-91	Ash Can	Holloman NM	0.859	90
08-23-76	H76-47/H-92	Ash Can	Holloman NM	0.628	80
08-25-76	H76-48/H-93	Ash Can	Holloman NM	0.274	70
08-30-76	H76-49/H-94x	Ash Can	Holloman NM	2.01	105
09-01-76	H76-50/H-95x	Ash Can	Holloman NM	4.85	120

2.3 Summary of Work Performed

Telemetry, beacon and command receiver antennas were installed as required for each launching.

Beacon, telemetry and command receiver units were installed as required.

Parachutes and associated recovery components were installed to permit recovery of special scientific payloads.

Wire and coaxial cable harnesses were fabricated and installed.

Laboratory personnel checked and installed fuel squibs and detonator blocks and assisted with the installation of the associated pyrotechnic train.

Engineering services were provided as required for each flight.

Laboratory personnel participated in all horizontal and vertical missile systems tests.

Flight and spare battery packs were prepared for each rocket.

Ground stations were operated to facilitate recovery of scientific data from the rockets.

Realtime and playback records were processed as required by the project scientists.

Air sampler calibrations for GFE sensors were performed and analyses of atmospheric conditions were made prior to each balloon flight.

Analyses to determine actual air flow rates, balloon trajectories and ambient atmospheric conditions, were made following each balloon flight.

2.4 GENERAL

Engineering work on the system configuration and assembly of a real-time telemetry station for Holloman AFB was completed during the contract period.

An IBM card reader was designed, fabricated and installed in the VAB telemetry ground station at WSMR to program the PSL PCM decommutator.

Foam Flex RF cables were installed at LC-37 to support the Aries and other Air Force prelaunch testing.

2.5 Equipment Acquired During the Contract Period

No equipment was acquired during the contract period.